Claims

1. A method for determining the content of a first component of a sample with the aid of a low-resolution nuclear magnetic resonance (NMR) pulse spectrometer,

said first component having a first self-diffusion coefficient D_1 and providing a first NMR signal, said sample additionally containing at least one further component having a further self-diffusion coefficient D_2 larger than said first self-diffusion coefficient D_1 and providing a further NMR signal,

comprising the steps of:

- exciting said sample by a radio frequency (RF) excitation pulse, exposing said sample to a magnetic gradient field and exposing said sample to a sequence of further re-focusing RF pulses for generating spin echo signals, wherein said magnetic gradient field is not switched-off during said sequence of further re-focusing RF pulses,

- detecting said spin echo signals and determining amplitude values of said spin echo signals, and

- determining a value for said content of said first component of said sample from said amplitude values of said spin echo signals.

2. The method of claim 1, wherein said gradient field is generated at least partially by gradient coils through which current flows.

3. The method of claim 1, wherein said gradient field is generated at least partially by at least one of ferromagnetic and permanent-magnetic elements.

4. The method of claim 1, wherein said gradient field is generated at least partially by displacing said sample from a homogeneity region of a magnet of said NMR pulse spectrometer.

5. The method of claim 1, wherein said magnetic gradient field also acts during said RF excitation pulse.

6. The method of claim 1, wherein said magnetic gradient field is switched-off during said RF excitation pulse.

7. The method of claim 1, wherein said least one measurement point of a free induction signal (FID) of said sample is measured after said RF excitation pulse.

8. The method of claim 7, wherein said at least one measurement point is measured in the absence of said magnetic gradient field.

9. The method of claim 8, wherein an overall proton signal containing proportions of said first component and said at least one further component of said sample is determined from said FID.

10. The method of claim 1, wherein said least one measurement point of a free induction signal (FID) of said sample is measured after said RF excitation pulse, and wherein an overall proton signal containing proportions of said first component and said at least one further component of said sample is determined from said FID.

11. The method of claim 1, wherein a gradient strength of said magnetic gradient field is set in such a way that, at the instant of the first spin echo, the NMR signal contribution of said at least one further component in said sample is essentially suppressed by diffusion under the action of said gradient.

12. The method of claim 1, wherein said content of said first component of said sample is obtained by back extrapolation of an amplitude decrease of said spin echo signals until the instant of excitation.

13. The method of claim 1, wherein said sample is a hydrous sample, and wherein said first component is fat.

14. The method of claim 13, wherein said at least one further component is water.

15. A low-resolution NMR pulse spectrometer comprising an apparatus for generating a magnetic field, an apparatus for generating RF transmission pulses, an apparatus for receiving NMR signals, an apparatus for generating a magnetic gradient field and a computer for driving said apparatuses, wherein said computer is programmed for carrying out and said apparatuses are configured for carrying out a method for determining the content of a first component of a sample with the aid of a low-resolution nuclear magnetic resonance (NMR) pulse spectrometer,
said first component having a first self-diffusion coefficient D_1 and providing a first NMR signal, said sample additionally containing at least one further component having a further self-diffusion coefficient D_2 larger than said first

self-diffusion coefficient D_1 and providing a further NMR signal,

comprising the steps of:

- exciting said sample by a radio frequency (RF) excitation pulse exposing said sample to a magnetic gradient field and exposing said sample to a sequence of further re-focusing RF pulses for generating spin echo signals, wherein said magnetic gradient field is not switched-off during said sequence of further re-focusing RF pulses,

- detecting said spin echo signals and determining amplitude values of said spin echo signals, and

- determining a value for said content of said first component of said sample from said amplitude values of said spin echo signals.

16. The low-resolution NMR pulse spectrometer of claim 15, wherein said apparatus for generating a magnetic gradient field comprises actively shielded gradient coils.